



Regulatory Document

Requirements for Leak Testing Selected Sealed Radiation Sources

A Regulatory Guide

Effective date: January 9, 1995

PREFACE

The Atomic Energy Control Board has three levels of Regulatory Documents, graduated in terms of their rigidity of application.

Level 1: Regulatory Guides

This is the most flexible form of regulatory document, providing advice or guidelines on certain aspects of the regulatory process.

Level 2: Regulatory Policy Statements

These contain firm requirements and guidelines for compliance. However, the AECB may allow variations, or consider alternative means of attaining the same objectives where a satisfactory case is made.

Level 3: Regulations

These are instruments by which the AECB establishes prohibitions, rights, obligations and powers pursuant to the *Atomic Energy Control Act*. Regulations possess the full force of law; they leave little room for interpretation.

All Regulatory Documents are initially issued in draft form as Consultative Documents, for comments by the public, special interest groups and those potentially affected by the content such as licensees and their employees.

Suggestions for new Regulatory Documents and for improvement to those that exist are encouraged and should be directed to the AECB Office of Public Information, as should requests for technical information on and interpretation of Regulatory Documents, if a subject matter specialist is not specified in the text.

Copies of Regulatory Documents are available in both English and French from the:

Office of Public Information
Atomic Energy Control Board
280 Slater Street
P.O. Box 1046
Ottawa, Ontario
CANADA K1P 5S9

Telephone: (613) 995-5894 or 1-800-668-5284

Facsimile: (613) 992-2915

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NOTICE

A draft of this Regulatory Document was issued for public comment as a Consultative Document (C-116) on February 25, 1991. On completion of the comment review and text revision process, the content was made effective on January 9, 1995.

Questions on the content of this document should be directed to:

Compliance and Laboratory Division
Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
CANADA
K1P 5S9

Telephone: (613) 990-8845

Fax: (613) 995-5086

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Requirements for Leak Testing Selected Sealed Radiation Sources

1. INTRODUCTION AND SCOPE

This guide describes the minimum requirements for leak testing a sealed source by means of a wipe sample and radioactive measurement of the sample. If a different method of leak testing is to be used the licensee shall make a written request to the Atomic Energy Control Board (AECB) that describes the leak test method to be used, and request the Board's permission to use that method.

This guide explains:

- (a) who is responsible for leak testing a sealed source;
- (b) the requirements for performing leak testing;
- (c) the requirements for record-keeping, and
- (d) the requirements for leak testing certificates, sampling certificates, and measuring certificates.

2. DEFINITIONS

In this guide:

"approved agency" means any person or company who is authorized by the AECB to provide licensees with services for the leak testing of sealed radiation sources; (*organisme accrédité*)

"containment" means any device, or source holder, or any enclosure that surrounds a sealed source; (*enveloppe de sécurité*)

"device" means any piece of equipment designated to utilize sealed sources; (*dispositif*)

"measurer" means an agency or licensee who measures leak test samples from sealed sources and reports findings; (*mesureur*)

"measuring equipment" means any radiation detection equipment that can detect 200 Bq (0.005 μ Ci) or less of an isotope of interest in the presence of background radiation. Such detection equipment may be a dose rate survey meter, a contamination survey meter, or a laboratory nuclear counting instrument; (*appareil de mesure*)

"sampler" means an agency or licensee who takes wipe samples from the surface or vicinity of sealed sources and sends the samples to a measurer; (*échantillonneur*)

"sealed source" means a radioactive prescribed substance sealed in a capsule or having a bonded cover, the capsule or cover being strong enough to prevent contact with and dispersion of the radioactive material under the conditions of use and wear for which it was designed, and includes the capsule or cover; (*source scellée*)

"wipe" means a suitable swab of material that is capable of contamination removal and collection. Typical wipes are commercial swipes, filter papers, and cotton tip applicators, moistened with a compatible liquid. Other materials and dry wipes are acceptable if they have the equivalent or the best contamination removal and collection capacity available; (*tampon*)

"written assessment" means any exchange of correspondence between the AECB and a licensee, or the AECB and an agency, concerning the requirements of this guide. (*évaluation écrite*)

3. RESPONSIBILITY FOR LEAK TESTING SEALED SOURCES

The requirements of this guide apply to licensees who

- (a) leak test sources themselves;
- (b) use the services of an approved agency to measure wipe samples collected by the licensee, or
- (c) use the services of an approved agency to collect and measure wipe samples.

Licensees who leak test sealed sources themselves will be responsible for obtaining AECB approval for their leak test services.

Licensees who contract an approved agency to measure wipe samples or to collect and measure wipe samples, will be responsible for obtaining AECB approval for their leak test services, but not for services provided by the contracted agency.

Approved agencies who measure wipe samples or collect and measure wipe samples for licensees are responsible for obtaining AECB approval for their leak testing services. Agencies wishing to be approved shall make a written request to the AECB for inclusion on the approved list. The AECB will maintain and provide upon request a list of approved agencies. Only those agencies listed will be considered acceptable to perform leak testing services for AECB licensees. The AECB will inspect the approved agencies periodically and revise the list as necessary. If a previously approved agency is subsequently found to be in non compliance, then any effected licensees will be notified. Where possible, notification will be sent to each individual licensee, or failing this, by wider circulation in the AECB quarterly journal *The Reporter*, or other convenient method.

Licensees and agencies may be inspected for compliance with this guide during any AECB physical inspection or by written assessment, or both.

4. SOURCE LEAK TESTING REQUIREMENTS

Sealed source wipe leak testing consists of two parts, wiping the source and measuring the wipe sample, and either or both parts may be done by a licensee or an approved agency. Three types of testing are anticipated:

- (a) licensee samples and measures;
- (b) licensee samples and approved agency measures, and
- (c) approved agency samples and measures.

Irrespective of who samples and measures, the time between sampling and measuring should be as short as practicable, and shall not exceed ten working days. This requirement should eliminate the need to correct the wipe sample measurement for radioactive decay, and minimize the possibility of sample deterioration.

4.1 Wipe Sampling Procedure Documentation

Before wiping any sealed source the licensee (irrespective of who is the wipe sampler) shall have available for inspection and assessment, a documented sampling procedure consisting of:

- (a) a general description of the method of wipe sampling;
- (b) a list of all sealed sources to be leak tested, and their locations;
- (c) a step by step procedure of the method for wipe sampling each type of sealed source and each type of sealed source containment including:
 - (i) operating instructions for sealed source drives, shutters, interlocks and safety features during sampling;
 - (ii) a description and reason for choice of physical configuration of the wipe, material of the wipe, and compatible solvent (if required);
 - (iii) a description of the method of wiping, and
 - (iv) a description of the location of wiping, which depending upon sealed source activity and sealed source accessibility may be from the exterior surface of the sealed source, or the immediate environment of the sealed source device or holder;
- (d) a description of the types of wipe sample containers including:
 - (i) means of identifying the wipe sample or container or both, and
 - (ii) the method of packaging and transporting to the measurer, and
- (e) an example of a completed leak test sampling certificate.

4.2 Requirements for Sampling

Sampling shall only be performed by a person who:

- (a) knows the requirements of this guide;
- (b) knows the type and activity of the sealed source and the sealed source containment;
- (c) can recognize and minimize the potential contamination and radiation hazards associated with:
 - (i) the sealed source and its containment, including any sealed source windows,
 - (ii) wipe sampling the sealed source or its immediate environment, and
 - (iii) the wipe sample;

- (d) has available and follows the procedure detailed in section 4.1, and
- (e) has available sufficient wipe sampling materials, wipe sample containers and blank leak test sampling certificates.

4.3 Requirements for Sampling Records

Immediately following sealed source wipe sampling, the sampler shall place the wipe sample in an identified container and complete a leak test sampling certificate in accordance with section 6.1. The sampler shall retain a copy of the certificate and send the original certificate and the sample container to the sample measurer.

4.4 Measuring Procedure Documentation

Before measuring any sealed source leak test wipe samples, the measurer shall have available a documented sample measuring procedure consisting of:

- (a) a general description of the method of measuring;
- (b) a step by step procedure for measuring wipe samples with the measuring equipment including:
 - (i) a description and identification of measuring equipment (make, model and serial number);
 - (ii) instructions, preferably including manufacturers' manuals, to set up, operate and measure samples;
 - (iii) a description of the tests to be performed using check sources to demonstrate the capability to make reproducible measurements, and to detect 200 Bq or less of each isotope of interest, and
- (c) an example of a completed leak test measuring certificate.

4.5 Requirements for Measuring

Measuring shall only be performed by a person who:

- (a) knows the requirements of this guide;
- (b) is familiar with the operation of the measuring equipment;
- (c) can recognize and minimize the potential radiation and contamination hazards associated with the wipe sample;
- (d) has available and follows the procedure detailed in section 4.4, and
- (e) has available sufficient blank leak test measuring certificates.

4.6 Requirements for Record Completion

Immediately following the wipe sample measurement, the measurer shall complete a leak test measuring certificate in accordance with section 6.2, retain a copy and send the original to the licensee. If the sampler was not the licensee, then the licensee shall also be sent a copy of the leak test sampling certificate. The measurer shall advise the licensee forthwith if a sealed source wipe sample has contamination which exceeds the leakage criterion of 200 Bq.

4.7 Frequency

The frequency for leak tests is specified in the licence conditions for applicable radioisotope licensed activities.

5. RECORD KEEPING REQUIREMENTS

Source leak testing records shall be kept as follows:

- (a) the licensee shall maintain for three years:
 - (i) a sealed source inventory,
 - (ii) all leak test sampling certificates, and
 - (iii) leak test measuring certificates

to show their sealed sources were leak tested at the required regulatory frequency and subsequent to any incident;

- (b) the licensee shall retain the originals of leak test measuring certificates;
- (c) the approved agency shall retain for three years:
 - (i) a copy of each leak test sampling certificate and each measuring certificate it produces, and
 - (ii) a copy of each leak test sampling certificate it receives from licensees.

6. LEAK TEST CERTIFICATE REQUIREMENTS

As described in section 4, leak testing consists of two parts, sampling and measuring, and the requirements for a leak test sampling certificate and a leak test measuring certificate are given below.

Several sealed sources may be documented on a certificate as long as the sealed sources are identical (with respect to isotope, make model, and containment), properly identified, and each sealed source is sampled and measured in the same way.

Licensees and approved agencies are free to design their own sampling and measuring certificates, and may combine them into a single leak test certificate, so long as the requirements for both sampling and measuring certificates are satisfied.

6.1 Leak Test Sampling Certificate Requirements

A sampling certificate shall contain the following information:

- (a) sampler's name, address, and telephone number;
- (b) licensee's name, address, AECB licence number, telephone number, and contact person;
- (c) sealed source identification (make, model, isotope, serial number, and/or identification of device or source holder and its locale);
- (d) brief description of wipe sampling method;
- (e) sample container identification (cross referenced as necessary to data in paragraph (c));
- (f) sampling date, and
- (g) signature of sampler.

6.2 Leak Test Measuring Certificate Requirements

A measuring certificate shall contain the following information:

- (a) the measurer's name, address and telephone number;
- (b) the licensee's name, address, AECB licence number, telephone number and contact person;
- (c) a cross-reference to the leak test sampling certificate;
- (d) a brief description of the measuring method;
- (e) the date of the last calibration and verification check of the measuring equipment;
- (f) the local background radiation as indicated by the measuring equipment;
- (g) the sample measurement value;
- (h) the calculation and evaluation of the sample measurement (including compensation and conversion factors);
- (i) the conclusions* and actions** of the test evaluation;
- (j) the measuring date, and
- (k) the signature of the measurer.

* In "Conclusions," the measurer shall state that the sealed source leakage is:

- (a) less or equal to the AECB leak test criterion of 200 Bq, or
- (b) greater than the AECB leak test criterion of 200 Bq.

If possible, the sealed source leakage should be quantified in becquerels and compared with the above-mentioned AECB criterion.

** In "Actions," if the sealed source leakage is greater than the AECB criterion, the measurer shall notify the licensee forthwith. The measurer shall also record on the certificate, the name of the person notified, the means (telephone or fax number) to make the notification, and the time and date of the notification.